Feed the Future Country Fact Sheet

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Ensuring Sustainable Tropical Soybean Production

Jeremy Guest

Kia Alexander (right), PhD student at the University of Illinois, speaks with farmers in the Tolon District of northern Ghana regarding their soybean production practices.

Soybean is a new crop for much of the developing world. Further, as a non-native, non-staple and commercial crop, research is needed to understand how soybean production affects smallholder farmers deciding to adopt the crop for the first time.

Although soybean provides an opportunity to address the challenges of food security by increasing income and improving nutrition at the household-level, understanding the tradeoffs between these achievements and the crop's impact on our environment is of critical importance.

Research by the **Feed the Future Innovation Lab for Soybean Value Chain Research**, led by the University of Illinois, Urbana-Champaign, shows 76 percent of the cost of soybean production for smallholder tropical farmers stems from labor and nine percent from chemical inputs, whereas costs incurred by advanced tropical producers are nine percent and 49 percent from labor and chemical inputs, respectively. The latter shift of resource inputs has been shown to increase yields by 400 percent.

Helping farmers transition to higher productivities and out of a cycle of poverty is at the heart of sustainable intensification. But sustainably increasing agricultural productivity requires an understanding of the impacts of soybean production on the environment, particularly how soybean production affects the soil, air, and water quality within smallholder farming communities. The Soybean Innovation Lab is engaged in research to understand the environmental and climate impacts of soybean production across a range of scales, as well as potential climate feedback on smallholder soybean production. Ensuring that improvements in income, nutrition, and food security are achieved along the same trajectory as climate resilience and robust ecosystem services is a central tenet of the Innovation Lab's research platform.

Dr. Jeremy Guest and his research group are leading the Soybean Innovation Lab environmental research program. They are examining the local environmental implications of soybean production and management practices in tropical settings by studying runoff flow, groundwater nutrient and pesticide concentrations, soil carbon dynamics, and gaseous emissions from soils. They are also exploring the local public health effects of intensified farming through worker and public health risk assessments and the monitoring of local drinking water quality. In addition to these investigations, the researchers are studying regional and global environmental impacts by quantifying mass and energy balances around study sites and utilizing life cycle assessment to understand the environmental implications of smallholder soybean production. The research is conducted in collaboration with researchers at the Savanna Agricultural Research Institute in Ghana.

By providing a solid foundational understanding of the environmental and climate impacts of smallholder soybean

production, the Soybean Innovation Lab research informs policy and agricultural decision makers as they consider a transition to soybean production in tropical settings. This research provides a fundamental understanding of how agricultural aid and investment influence farmer decision-making and drive environmental change when growing soybean.